©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at

Nachr. ent. Ver. Apollo, Frankfurt, N. F., Bd. 5, Heft 4: 95–105 – März 1985 

# Recent records for parasitism in Saturniidae (Lepidoptera)

by

RICHARD S. PEIGLER

**Abstract:** Numerous records of parasites reared from Saturniidae are given, several of which are previously unpublished host-parasite associations. Records are from several regions of the U.S.A. and Central America, with a few from Hong Kong and one from France. Parasites reported here belong to the dipterous family Tachinidae and the hymenopterous families Ichneumonidae, Braconidae, Chalcididae, Perilampidae, Torymidae, Eupelmidae, and Eulophidae.

**Neuere Beobachtungen über Parasitismus bei Saturniidae (Lepidoptera)**

**Zusammenfassung:** Es werden verschiedene Beobachtungen über Parasiten, die aus Saturniiden gezüchtet wurden, gegeben, von denen einige bisher noch unbekannte Wirt-Parasit-Beziehungen darstellen. Die Beobachtungen stammen aus verschiedenen Regionen der USA und Zentralamerikas, einige aus Hongkong und eine aus Frankreich. Die hier genannten Parasiten gehören zu der Dipterenfamilie Tachinidae und den Hymenopterenfamilien Ichneumonidae, Braconidae, Chalcididae, Perilampidae, Torymidae, Eupelmidae und Eulophidae.

Insbesondere wird auf die Notwendigkeit, alle erreichbaren Nachweise von Parasitismus bei Schmetterlingslarven zu dokumentieren und die Parasiten von entsprechenden Fachleuten bestimmen zu lassen, hingewiesen. Sorgfältige Zuchtarbeit ist nötig, um einwandfreie Zuordnung der Parasiten zu ihrem jeweiligen Wirt zu ermöglichen; am besten eignet sich hierfür die Einzelhaltung parasitismusverdächtigter Larven. Auch Hyperparasitismus läßt sich nur bei sorgfältiger Isolation einzelner Raupen feststellen. In jedem Falle sollten folgende Informationen soweit möglich gegeben werden zu festgestellten Parasiten: Herkunftsort, Wirt, Futterpflanze des Wirts, Sammel- und Schlupfdatum, Anzahl der Parasiten pro Wirt, ob die

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



Verpuppung des Parasiten innerhalb oder außerhalb des Wirts bzw. des Kokons stattfindet, welches Stadium des Wirts befallen wird und welches Stadium des Wirts von der Parasitenlarve bzw. der Imago wieder verlassen wird. Gerade beim Versand von Lepidopteren-Zuchtmaterial sollte auf die Verwechslungsgefahr geachtet werden.

## Introduction

Those who collect and rear Lepidoptera frequently find that they obtain parasitic specimens of Diptera and Hymenoptera instead of the moths and butterflies. In the past, such parasites were usually discarded in disgust, but most amateur and professional entomologists of today recognize the importance of retaining this material because of the valuable records of host-parasite relationships. Fortunately, authors of recent books on Lepidoptera such as GARDINER (1982) and BARLOW (1982) emphasize the need to retain parasites from rearings, and sending the material with full data to specialists. On the other hand, reports of unidentified parasites like the following one on rearing *Saturnia cephalariae* ROMANOFF by DE FREINA (1979: 192) are nearly worthless: „Diese Raupen werden von einer großen Ichneumonidea-Art sowie einer größeren Tachinide verfolgt."

As a specialist of Saturniidae moths, I have encountered numerous parasites over the past several years, and some of my colleagues have given me at my request other parasites which they reared from Saturniidae. The records cited below are ones which I have obtained since my earlier reports for parasitism in the saturniid genera *Anisota* HÜBNER (RIOTTE & PEIGLER 1981), *Callosamia* PACKARD (PEIGLER 1977), and *Hemileuca* WALKER (KENDALL & PEIGLER 1981).

Some of the host records cited below are previously unpublished for the particular parasites, or at least represent a new geographical region for the host-parasite relationship. All hosts cited below belong to the Saturniidae. Material from all rearings has been deposited in museums to enable future workers to recheck the determinations. The abbreviations used for these are as follows:

USNM – United States National Museum of Natural History, Washington, D.C.
LACM – Los Angeles County Museum of Natural History, Los Angeles, California
TAMU – Texas A&M University (Entomology Department Collection), College Station, Texas
BMNH – British Museum (Natural History), London, England
RMNH – Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



## Materials & Methods

It seems worthwhile to offer some recommendations on how to obtain and properly prepare parasites which are reared from the Lepidoptera collected. If parasites are not wanted, it is best to collect caterpillars in the earliest possible instar and to rear them indoors or with protection of cloth or fine-screen cages outdoors. If parasites are wanted, caterpillars collected in the later instars are more likely to be parasitized, or rearing can be done outdoors under coarse screens.

When a group of cocoons or pupae is collected in the field, it is wise to retain those which are considered to be lightweight compared to those heavier ones that will apparently produce healthy moths. These should be kept in individual containers. In the first years of collecting cocoons of *Rothschildia lebeau forbesi* I discarded in the field those which contained maserated pupae, and thus missed obtaining *Spilochalcis mariae*. Likewise, the fact that maggots of *Winthemia datanae* emerged from dead pre-pupae two to three weeks after sibling hosts pupated, leads me to conclude that I had unknowingly discarded this parasitic species in my rearings of several previous years. Many parasites, especially tachinids, are likely to die from dessication if not given some protection. Water can be added carefully but containers must not be airtight because mold will form and kill the parasites before they emerge. Tachinid puparia are best kept in sand or soil that is wetted every few days.

Besides locality and host, the following data should be recorded whenever possible: hostplant of host, number of parasites per host, whether parasite pupates within or outside host, which stage of host is attacked and which stage of host yields the adult parasite. If host material is mailed or transported from the original collecting site, care should be taken to avoid confusion of the geographical source of the parasite.

## HYMENOPTERA

### Ichneumonidae: Ichneumoninae

*Cratichneumon insulae* HEINRICH, determined by R. S. PEIGLER using key in HEINRICH (1977). Baton Rouge, Louisiana, emerged 7 August 1982 from pupa of *Hemileuca maia* (DRURY) collected by Dr. JOSEPH E. EGER, Jr. The parasites attack host pupae at or just below ground level. Two specimens were obtained, one per host, and were deposited in BMNH and LACM.

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



**Ichneumonidae: Pimplinae**

*Itoplectis conquisitor* (SAY), det. I. D. GAULD. Charleston County, ca. 8 km west of Awendaw, South Carolina, emerged indoors 26 February 1979 from cocoon of *Callosamia securifera* (MAASSEN) collected by R. S. PEIGLER. This is a hyperparasite of *Enicospilus americanus* (see below), chewing a hole in the side of the host ichneumonid cocoon and then exiting through the anterior valve of the moth cocoon. It is probably a facultative hyperparasite, although the ovipositor of the female can possibly detect whether a moth pupa or *Enicospilus* cocoon is within the moth cocoon. The single female reared is in BMNH.

**Ichneumonidae: Ophioninae**

*Enicospilus americanus* (CHRIST), det. I. D. GAULD. Stubblefield Lake Recreation Area, Walker County, Texas, in cocoons of *Callosamia promethea* (DRURY), collected by R. S. PEIGLER & TIMOTHY P. FRIEDLANDER. Among ca. 30 moth cocoons collected on one trip, ca. 25 contained *E. americanus*. I believe that populations of *C. promethea* move and fluctuate, followed by the parasite; I observed the same phenomenon with this parasite in *C. securifera* in Berkeley County, South Carolina over several winters. Parasites from the Texas rearing were deposited in BMNH and LACM.

*Enicospilus americanus*, det. I. D. GAULD. Aurora, Colorado, emerged spring 1982 from cocoons of *Automeris io* (FABRICIUS) collected as larvae on *Salix* by STEVE STONE. Specimens are in BMNH and LACM.

*Enicospilus* near, but not *americanus*, det. I. D. GAULD. Bentsen-Rio Grande Valley State Park, Hidalgo County, Texas, emerged 1981 and 1982 from cocoons of *Rothschildia lebeau forbesi* BENJAMIN, collected by R. S. PEIGLER, J. E. EGER & CHARLES W. AGNEW. The wasp shows morphological differences from true *E. americanus* according to GAULD. The parasite has a phenology similar to that of the host, usually emerging in April and October, and like the host easily capable of remaining in the pupal stage for more than two years. Specimens are in BMNH and LACM.

**Ichneumonidae: Anomaloninae**

*Habronyx pyretorum* (CAMERON), det. I. D. GAULD. Hong Kong, emerged 1980 from cocoon of *Saturnia pyretorum* WESTWOOD, reared and sent to me

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



by Dr. MIKE J. BASCOMBE. This species is apparently very rare in collections and probably has not been reared since the original report in 1912 from the identical host and locality (TOWNES et al. 1961). The male from the 1980 rearing was sent to LACM.

*Habronyx magniceps* (CRESSON), det. I. D. GAULD. Guadelupe Canyon, Peloncillo Mountains, Cochise County, Arizona, reared from pupa of *Anisota oslari* W. ROTHSCHILD by MICHAEL J. SMITH. The solitary parasite emerges from the anterior end of the host pupa. The large black and brown wasp has dark wings, yellow antennae and legs, and a flattened abdomen. A pair sent to me by SMITH was deposited in BMNH.

**Ichneumonidae: Cryptinae (=Gelinae)**

*Gambrus nuncius* (SAY), det. R. S. PEIGLER. Aurora, Colorado, May 1982, in cocoons of *Hyalophora cecropia* (LINNAEUS) collected by STEVE STONE. Greenville, South Carolina, April/May 1983, a brood of 6 males and 19 females emerged from a cocoon of *Callosamia angulifera* (WALKER) collected by R. S. PEIGLER; entire series deposited in BMNH. Greenville, S.C., May 1984, series of 11 males and 15 females emerged from a cocoon of *C. angulifera*, collected by R. S. PEIGLER; entire series deposited in LACM. The emergence pattern of the latter brood was 13 May (1 male), 14 (7 m.), 15 (1 female), 16 (2 m., 7 f.), 17 (1m., 3 f.), 18 (2 f.), 19 (2 f.).

*Isdromas lycaenae* (HOWARD), det. R. S. PEIGLER. Reported by RIOTTE & PEIGLER (1981) as a hyperparasite of the ichneumonid *Hyposoter fugitivus* (SAY) in *Anisota* from North Carolina. The following records are from the same parasite host in *Anisota* from new regions: Stubblefield Lake Recreation Area, Walker County, Texas, October 1979, G. W. BROOKS collector. Greenville, South Carolina, 1 October 1982, in *Anisota peigleri* RIOTTE, collected by R. S. PEIGLER. Voucher material from both these rearings of *I. lycaenae* is in LACM.

*Gnotus* sp., det. K. VAN ACHTERBERG. Aurora, Colorado, 1982, collected by STEVE STONE. These are hyperparasites of the braconid *Apanteles* attacking half-grown larvae of *Hyalophora cecropia.* Specimens are in RMNH.

**Braconidae: Microgasterinae**

*Apanteles electrae* VIERECK, det. K. VAN ACHTERBERG. Terry County, ca. 10 km southeast of Wellman, Texas, May 1981, reared from larvae of *Hemileuca*

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



*artemis?* PACKARD on *Quercus harvardii*, collected by ROY O. KENDALL & CONWAY A. KENDALL. Specimens are in RMNH. According to VAN ACHTERBERG, *A. electrae* 1912 may be a synonym of *A. hemileucae* Riley 1881 which differs only in color.

*Apanteles* sp., det. K. VAN ACHTERBERG. Hong Kong, 1981, reared from mature larva of *Loepa katinka* (WESTWOOD) by M. J. BASCOMBE. Specimens are in RMNH.

*Apanteles* sp., det. K. VAN ACHTERBERG. Hong Kong, 1981, reared from young larva of *Samia cynthia* (DRURY) by M. J. BASCOMBE. Specimens are in RMNH.

The genus *Apanteles* is widely distributed and contains hundreds of species, some of which are unnamed. It is currently not possible to identify most species down to the specific level, due to lack of keys. The wasps are usually small and black, gregarious, and spin white cocoons on the larva of the host species which dies shortly afterwards without pupating.

**Chalcidoidea: Chalcididae**

*Spilochalcis mariae* (RILEY). Jocotepec, Jalisco, Mexico, series emerged June 1979 from cocoon of *Rothschildia* collected by R. L. HALBERT Baton Rouge, Louisiana, emerged February 1976 from cocoon of *Antheraea polyphemus* (CRAMER) collected by J. E. EGER. Hidalgo County, Texas, brood emerged February 1980 from a cocoon of *Rothschildia lebeau forbesi* collected by J. E. EGER & C. W. AGNEW. The emergence pattern of the latter brood was as follows: 21 Feb. (1 female), 22 (15 males, 16 females, 23 (f m., 8 f.), 24 (1 f.), 28 (1 f.). In general, smallest wasps emerged last, whereas in *Gambrus* the smallest wasps usually emerge first. Compare above data to emergence pattern of *S. mariae* given by PACKARD (1914: 247). College Station, Brazos County, Texas, 31 August 1979, a small brood emerged from a cocoon of *Thyridopteryx ephemeraeformis* (HAWORTH) (Psychidae), collected by TIM J. KRING. As far as I am aware, this is the first report of *S. mariae* from a host which is not a saturniid. The Louisiana material was determined by G. GORDH, all others by R. S. PEIGLER. Material from all four rearings is in LACM.

It would be a worthwhile undertaking to observe the adult wasps to determine if the enlarged femora of *S. mariae* have a function in aggression, courtship, or oviposition (see COWAN 1979).

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



*Ceratosmicra meteori* BURKS, det. R. S. PEIGLER. Greenville, South Carolina, June 1980, hyperparasites of *Hyposoter fugitivus* in *Dryocampa rubicunda* (FABRICIUS) on *Acer rubrum*, collected by R. S. PEIGLER. Specimens in LACM.

**Chalcidoidea: Perilampidae**

*Perilampus carolinensis* SMULYAN, det. R. S. PEIGLER, Greenville, South Carolina, May/June 1980, hyperparasites in tachinid puparia (probably *Lespesia anisotae*) reared from *Anisota peigleri* by TONEY C. BOOZER. Specimens in LACM. This irridescent blue-green wasp was reported by RIOTTE & PEIGLER (1981) as a larval parasite of *Anisota* in Maryland, but I now believe that the rearing was also probably of a hyperparasite in a tachinid. Possibly the perilampid is a facultative hyperparasite.

**Chalcidoidea: Torymidae**

*Microdontomerus fumipennis* CRAWFORD, det. E. E. GRISSELL. Rosemont Junction, Highway 83, Pima County, Arizona, emerged 18–21 June 1984 from cocoon of Ophioninae (Ichneumonidae) within a cocoon of *Agapema galbina anona* (OTTOLENGUI) on *Condalia spathulata*, collected by JOHN PALTING. The ophionine cocoon had four emergence holes in it. This parasite has generally been recorded as parasitizing various Lepidoptera, but in view of the present case of hyperparasitism, earlier records could also have been of the same situation. The species is probably a facultative hyperparasite. The specimens were sent to me by STEVE STONE and are now in USNM.

*Monodontomerus minor* (RATZEBURG). Aurora and Denver, Colorado, 1980 and 1982, hyperparasites on tachinid parasites in cocoons of *Hyalophora cecropia* collected by STEVE STONE. The wasps have a metallic green color. The species has been recorded as a hyperparasite of *Gambrus nuncius*, a cryptine ichneumonid which parasitizes several Saturniinae of North America. Specimens were deposited in USNM.

**Chalcidoidea: Eupelmidae**

*Anastatus reduvii* (HOWARD), det. E. E. GRISSELL. Beeville, Bee County, Texas, emerged 2 March 1977 from egg of *Eupackardia calleta* (WESTWOOD)

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



on *Leucophyllum frutescens* collected by R. S. PEIGLER. The specimen is much larger than conspecific ones reared from smaller host eggs (e.g. *Anisota*). The specimen is in USNM.

*Anastatus furnissi* BURKS, det. M. E. SCHAUFF. Greenville, South Carolina, July 1984, several emerged from eggs of *Callosamia promethea*, one parasite per egg, collected by R. S. PEIGLER. One specimen is in USNM.

**Chalcidoidea: Eulophidae**

*Tetrastichus* sp., det. M. E. SCHAUFF. Same data as *A. furnissi* above. Two wasps emerged from a single egg. Two host eggs in the clump produced larvae of *C. promethea*, having been left unparasitized by both ovipositing mothers of *A. furnissi* and *Tetrastichus*. Specimens were sent to LACM.

## DIPTERA

**Tachinidae: Goniinae**

*Winthemia datanae* (TOWNSEND), det. N. E. WOODLEY Greenville, South Carolina, three flies emerged November and December 1982 from *Anisota peigleri* collected by R. S. PEIGLER. The maggots emerged in October from dead pre-pupae of the host, one per pre-pupa, two to three weeks after sibling hosts pupated. Specimens are in USNM and LACM.

*Lespesia samiae* (WEBBER), det. N. E. WOODLEY Aurora, Colorado, emerged March 1982 from cocoons of *Hyalophora cecropia* collected by STEVE STONE. Specimens are in USNM.

*Lespesia sabroskyi* BENEWAY, det. N. E. WOODLEY Glassy Mountain, Pickens County, South Carolina, May 1979, seven flies emerged from a cocoon of *Antheraea polyphemus* collected by TONEY C. BOOZER. Ocala National Forest, Marion County, Florida, 10 May 1983, *ex* cocoon of *A. polyphemus*, STEVEN PASSOA. Parasites from these two rearings are in USNM. The maggots chew a small hole in the host cocoon, squeeze through, drop to the ground, and pupate in the soil. Adult flies would be unable to escape from the strong cocoon of the host.

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



*Lespesia* sp. near, but not *texana* (WEBBER), det. C. W. SABROSKY Atenquique, Jalisco, Mexico, August 1978, *ex* cocoon of *Rothschildia* collected by J. C. SCHAFFNER & DONALD W. PLITT A pair from this rearing is in the USNM and most of the series is in TAMU. The species is mentioned by SABROSKY (1980: 73). This tachinid shows conspicuous sexual dimorphism in that males have slender, black glossy abdomens whilst females have thicker, dark gray abdomens.

*Lespesia* sp. near, but not *texana*, det. N. E. WOODLEY General Hitchcock Picnic Area, Santa Catalina Mountains, Pima County, Arizona, emerged 13–16 June 1984 from cocoons of *Agapema homogena* DYAR collected in September 1983 on *Rhamnus californicus* as late instar larvae by JOHN PALTING. Voucher material is in USNM. This species is probably the same as the previous one reared from *Rothschildia*, according to WOODLEY

*Lespesia* sp. (*archippivora* group), det. N. E. WOODLEY Highway 82, Cochise County, Arizona, emerged November 1983 from cocoons of *Agapema galbina anona* collected on *Condalia spathulata* by STEVE STONE. Flies from a second rearing from the same host moth and same collector emerged November 1984 from material collected 50 km east of Douglas, 3 km west of Guadelupe Canyon, Cochise County, Arizona. Examples of the 1983 rearing are in USNM and the 1984 one in LACM.

*Masicera pavoniae* (ROBINEAU-DESVOIDY), det. N. E. WOODLEY Gordes, Vaucluse, France, emerged 14 May 1979 *ex* cocoon of *Saturnia pavonia* (LINNAEUS) collected as a mature larva in July 1978 by Dr. CLAUDE LEMAIRE. The specimen is in USNM.

*Eumasicera sternalis* (COQUILLETT), det. N. E. WOODLEY Burke County, Georgia, August 1976, emerged from pupa of *Dryocampa rubicunda* collected as a larva on *Acer rubrum* by R. S. PEIGLER. This species was reported from the same host in the northeastern U.S.A. by SCHAFFNER & GRISWOLD (1934). It appears to be a specialist on Ceratocampinae (ARNAUD 1978). The specimen is in USNM.

*Carcelia formosa* (ALDRICH & WEBBER), det. N. E. WOODLEY Aurora, Colorado, April 1982, *ex Automeris io*, STEVE STONE. SCHAFFNER & GRISWOLD (1934) recorded the same parasite from the same host in the northeastern U.S.A. Examples from the Colorado rearing are in USNM and LACM.

*Chetogena* sp., det. N. E. WOODLEY Aurora, Colorado, 3 March 1982, *ex Automeris io*, STEVE STONE. This small fly has a reddish puparium. The fly is in USNM. The genus is not cited by ARNAUD (1978). The group needs revision, and so most species are not presently identifiable, according to WOODLEY

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



*Leschenaultia* sp., det. N. E. WOODLEY La Unión, Departamento de Olancho, Honduras, October 1981, *ex* pupa of *Hylesia* on *Pinus*, Dr. JERRY MANKINS. This specimen was sent to me by STEVEN PASSOA, and is now in USNM.

*Belvosia argentifrons* ALDRICH, det. N. E. WOODLEY Gainesville, Florida, emerged 17 February 1983 from pupa of *Citheronia regalis* (FABRICIUS) collected as a larva by C. BENNETT Sent to me by STEVEN PASSOA, and now in USNM. ARNAUD (1978) cited no host records for this parasite.

*Belvosia bifasciata* (FABRICIUS), det. N. E. WOODLEY Baton Rouge, Louisiana, August 1980, emerged from pupae of *Hemileuca maia*, one per host, collected by J. E. EGER. I have collected adults of this parasite in Greenville, South Carolina in August 1984 feeding on nectar of flowers of *Euonymus*. Voucher material is in USNM and LACM.

*Belvosia townsendi* ALDRICH, det. N. E. WOODLEY Austin, Texas, July 1976, *ex* pupa of *Eacles imperialis nobilis* NEUMOEGEN, collected by H. PIANKA, given me by T P. FRIEDLANDER. The host contained two flies, which are deposited in USNM. Another rearing of this parasite was as follows: Sonoita Creek, Santa Cruz County, Arizona, 1972, *ex Eacles oslari* W. ROTHSCHILD. I sent voucher material to USNM.

## Acknowledgments

I am grateful to those individuals cited in this paper as having reared or sent me parasites. Special thanks must go to STEPHEN E. STONE, Dr. JOSEPH E. EGER, Jr. and STEVEN PASSOA, each of whom provided material for several important records reported herein. My appreciation is also extended to the research entomologists at the U. S. Department of Agriculture in Beltsville, Maryland, who are cited as determiners of the various parasites, especially to Dr. NORMAN E. WOODLEY who identified the largest portion. Additionally, Dr. IAN D. GAULD of the BMNH and Dr. KEES VAN ACHTERBERG of the RMNH kindly identified specimens at my request.

## Literature

ARNAUD, P. H. Jr. (1978): A host-parasite catalog of North American Tachinidae (Diptera). –– U. S. Dept. Agric. Misc. Publ. **1319**: 1–860.

BARLOW, H. S. (1982): An introduction to the moths of South East Asia. –– Kuala Lumpur (Malayan Nature Soc.).

©Entomologischer Verein Apollo e.V. Frankfurt am Main; download unter www.zobodat.at



COWAN, D. P. (1979): The function of enlarged hind legs in oviposition and aggression by *Chalcis canadensis* (Hymenoptera: Chalcididae). –– Great Lakes Entom. **12** (3): 133–136.

DE FREINA, J. J. (1979): Beitrag zur systematischen Erfassung der Bombyces- und Sphinges-Fauna Kleinasiens. –– Atalanta **10** (3): 175–224.

GARDINER, B. O. C. (1982): A silkmoth rearer's handbook. –– Amat. Entom. **12**: 1–255 p., 58 pls.

GAULD, I. D. and P. A. MITCHELL (1981): The taxonomy, distribution and host preferences of Indo-Papuan parasitic wasps of the subfamily Ophioninae (Hymenoptera: Ichneumonidae). –– Slough (Commonwealth Agricultural Bureaux).

HEINRICH, G. H. (1977): Ichneumoninae of Florida and neighboring states (Hymenoptera: Ichneumonidae, subfamily Ichneumoninae). –– Arthropods of Florida and Neighboring Land Areas, vol. **9**: 1–350.

KENDALL, R. O. and R. S. PEIGLER (1981): *Hemileuca grotei* (Saturniidae): its morphology, natural history, spatial and temporal distribution. –– J. Lepid. Soc. **35** (1): 41–50.

KROMBEIN, K. V., P. D. HURD, Jr., D. R. SMITH and B. D. BURKS (eds.) (1979): Catalog of Hymenoptera in America north of Mexico, 3 vols. –– Washington, D. C. (Smithsonian Inst. Press).

PACKARD, A. S. (1914): Monograph of the bombycine moths of North America, part 3 (edited by T. D. A. COCKERELL). –– Mem. Natl. Acad. Sci. **12**: 1–516, 113 pls.

PECK, O. (1963): A catalogue of the Nearctic Chalcidoidea (Insecta: Hymenoptera). –– Can. Ent., Suppl. **30**: 1–1092.

PEIGLER, R. S. (1977): Parasitism of *Callosamia*. –– J. Georgia Entomol. Soc. **12** (2): 111–114.

RIOTTE, J. C. E. and R. S. PEIGLER (1981): A revision of the American genus *Anisota* (Saturniidae). –– J. Res. Lepid. **19** (3): 101–180.

SABROSKY, C. W. (1980): A revised key to the Nearctic species of *Lespesia* (Diptera: Tachinidae). –– Ann. Entomol. Soc. Amer. **73** (1): 63–73.

SCHAFFNER, J. V. and C. L. GRISWOLD (1934): Macrolepidoptera and their parasites reared from field collections in the northeastern part of the United States. –– U. S. Agric. Misc. Publ. **188**: 1–160.

TOWNES, H., M. TOWNES and V. K. GUPTA (1961): A catalogue and reclassification of the Indo-Australian Ichneumonidae. –– Mem. Amer. Entomol. Inst. **1**: 1–522.

Address of the author:

Dr. RICHARD S. PEIGLER, 303 Shannon Drive, Greenville,
South Carolina 29615, U.S.A.